The impact of sample size, detection technique and parasite population on the faecal egg count reduction test in goats: a case study

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The faecal egg count reduction test (FECRT) is a common technique to monitor anthelmintic drug efficacy against gastro-intestinal nematodes in animals. At present, there is a recognized need to revise the guidelines on how to perform a FECRT for the different host and parasite species. Although studies indentifying the possible factors affecting the final interpretation of FECR a merits priority, they demand both time expensive and consuming experiments. Moreover, the commonly used multivariate models used to analyse these multi-factorial study designs are merely descriptive rather than provide decision supporting properties. Statistical simulations and tree-based models (e.g. classification trees) are acknowledged alternatives for a cost-reduced data generation and a decision supporting analysis, respectively, but are rarely applied. In the present, a simulation study was performed in which FECRT tests were conducted under varying conditions of parasite populations (mean faecal egg counts and the aggregation of the eggs among hosts before drug administration), sample size, analytic sensitivity of the detection technique and true drug efficacies. Classification trees were built to explore the impact on the sensitivity and the specificity of detecting a truly reduced efficacy (true drug efficacy

below 90 and below 95%). Finally, some practical guidelines for cost-efficiently evaluating drug efficacy in future monitoring programmes in goats are discussed.